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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/002,978	12/06/2001	Jung-Yu Hsieh	4425-224	4986

7590

07/11/2003

LOWE HAUPTMAN GILMAN & BERNER, LLP  
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EXAMINER

LE, THAO X

ART UNIT PAPER NUMBER

2814

DATE MAILED: 07/11/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/002,978

Applicant(s)

HSIEH ET AL.

Examiner

Thao X Le

Art Unit

2814

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 30 April 2003.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 20-28 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 20-28 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04 September 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Acknowledgement*

1. Applicant's cancellation of claims 1-19 in Paper No. 10 is acknowledged.

### *Claim Rejections - 35 USC § 103*

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 20-22, 24-25 and 27-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 6163050 to Hisatomi et al. in view of US 6187633 to Dong et al.

Regarding to claims 20, 21, 27, Hisatomi discloses a method for forming an oxide-nitride-oxide structure fig. 2 in one chamber, the method comprising the steps of: providing a

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substrate 33, column 6 line 35, forming a first oxide layer 36-1, column 6 line 44, on substrate, by introducing dichloro silane and nitrous oxide gas, forming a first buffer layer 36-4, column 7 line 38, on first oxide layer, forming a silicon nitride layer 36-2, column 6 line 50, on first buffer layer, forming a second buffer layer 36-5, column 7 line 41, on silicon nitride, and forming a second oxide layer 36-3, column 6 line 56, on second buffer layer.

But, Hisatomi does not expressly disclose the first oxide layer includes no Cl and first oxide layer is formed by introducing silane and nitrogen oxide gas.

However, Dong reference discloses a method for forming the oxide film 16 includes no Cl using different silicon precursor such as silane or dichloro silane with oxygen source, column 3 lines 5-17. At the time the invention was made; it would have been obvious to one of ordinary skill in the art to use the oxide film formation by the silane and nitrous oxide teaching of Dong with Hisatomi method, because such material substitution would have been considered a mere substitution of art-recognized equivalent values. In addition, such oxide film formation by using silane gas and nitrogen gas is well known in the art as it is disclosed by Applicant Admitted Prior Art (APA), specification page 3 and US 6235652 to Cook, column 1 lines 30-60

Regarding to claim 22, 25 Hisatomi discloses the method wherein the first and second buffer layer 36-4 and 36-5 is SiON, fig. 2, column 7 lines 39-41.

Regarding to claim 24, Hisatomi discloses the method wherein the silicon nitride layer 36-2, column 6 line 50, is formed by introducing dichloro silane and ammonia, column 6 line 46.

But Hisatomi does not disclose the method wherein the silicon nitride layer is formed by introducing silane and ammonia.

However, Dong reference discloses the silicon nitride layer 18 using different silicon precursor such as silane or dichloro silane with ammonia, column 3 lines 218-27. At the time the invention was made; it would have been obvious to one of ordinary skill in the art to use silane and ammonia to form silicon nitride teaching of Dong with Hisatomi, because such material substitution would have been considered a mere substitution of art-recognized equivalent values. Also, such silicon nitride film formation by using silane gas and ammonia gas is well known in the art as Applicant Admitted Prior Art (APA), specification page 3, discloses it.

Regarding to claim 28, Hisatomi discloses the method wherein the oxide-nitride-oxide structure is formed on the wafer, fig. 2.

4. Claims 23, 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 6163050 to Hisatomi and US 6187633 to Dong et al as applied to claim 20 above, and further in view of US 4954867 to Hosaka.

Regarding to claims 23, 26, Hisatomi disclose the method wherein first and second buffer layers, 36-4 and 36-5, are formed by introducing dichloro silane, nitrogen oxide, and ammonia, column 7 lines 37-38.

But Hisatomi does not expressly disclose the method wherein first and second buffer layer is formed by introducing silane, nitrogen oxide, and ammonia.

However, Hosaka reference discloses the method for forming a buffer layer (SiON) 4 by introducing silane, nitrogen oxide, and ammonia, column 2 lines 45-60. At the time the invention was made; it would have been obvious to one of ordinary skill in the art to use silane, nitrogen oxide, and ammonia to form SiON teaching of Hosaka with

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Hisatomi method, because such material substitution would have been considered a mere substitution of art-recognized equivalent values.

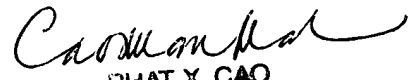
***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thao X Le whose telephone number is 703-306-0208. The examiner can normally be reached on M-F from 8:00 AM - 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael M Fahmy can be reached on 703-308-4918. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

Thao X. Le  
June 20, 2003

  
PHAT X. CAO  
PRIMARY EXAMINER